Hepatitis C

Prepared by

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Centers for Disease Control and Prevention

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Features of Hepatitis C Virus Infection

Incubation period	Average 6-7 weeks Range 2-26 weeks
Acute illness (jaundice)	Mild (≤20%)
Case fatality rate	Low
Chronic infection	75%-85%
Chronic hepatitis	70% (most asx)
Cirrhosis	10%-20%
Mortality from CLD	1%-5%

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Chronic Hepatitis C
Factors Promoting Progression or Severity

- Increased alcohol intake
- Age > 40 years at time of infection
- HIV co-infection
- ?Other
  - Male gender
  - Other co-infections (e.g., HBV)

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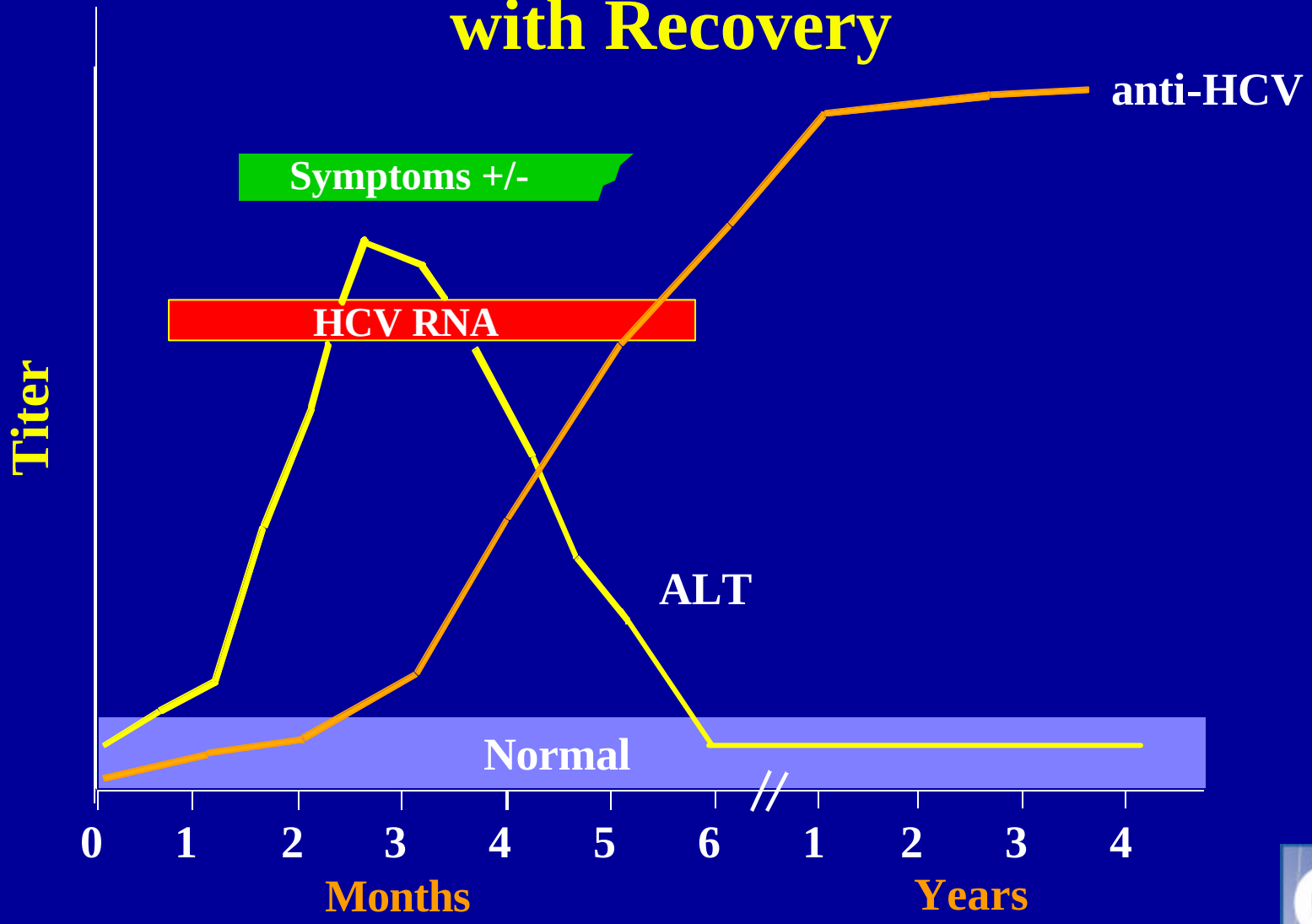
Serologic Pattern of Acute HCV Infection with Recovery



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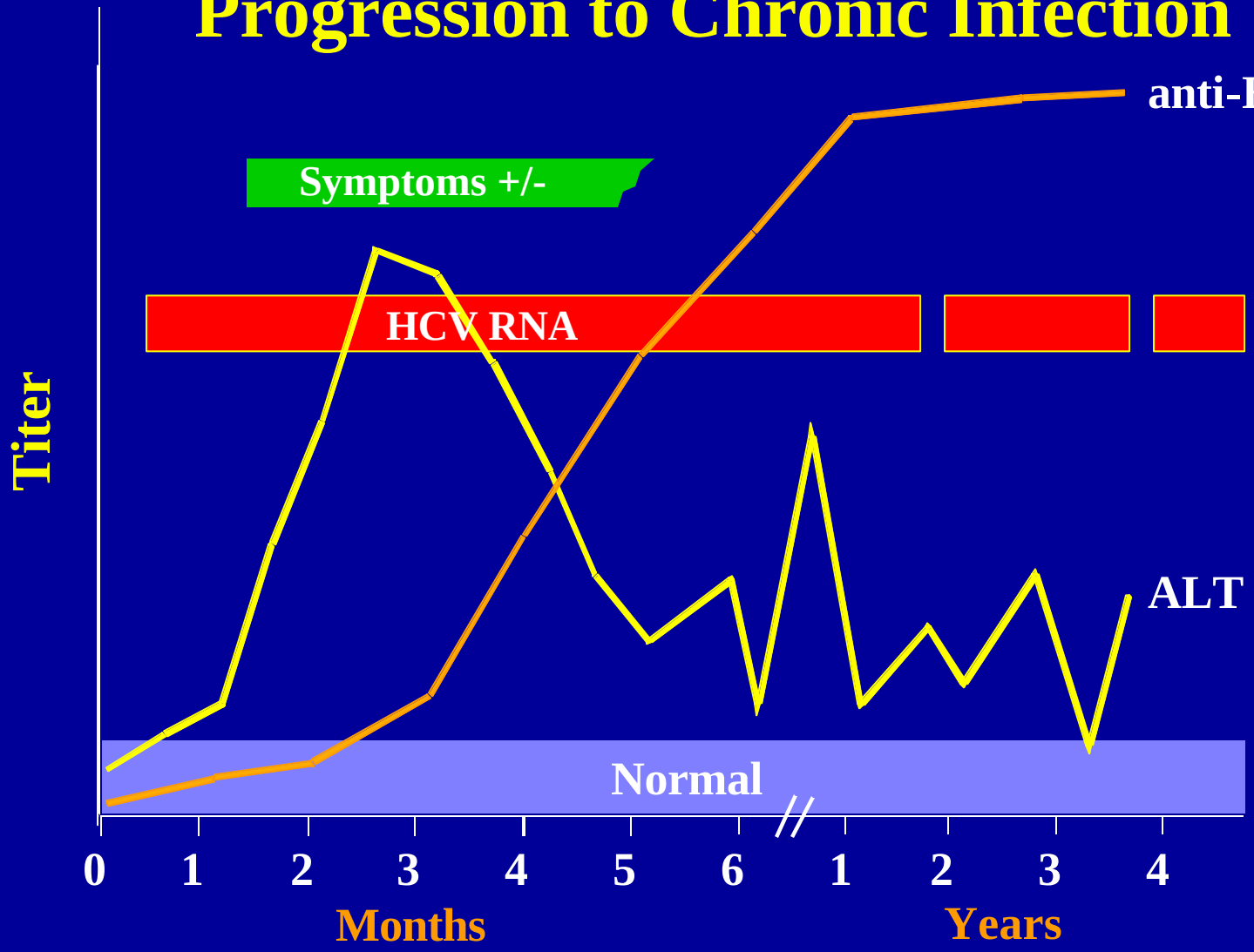
Serologic Pattern of Acute HCV Infection with Progression to Chronic Infection



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Hepatitis C Virus Infection, United States

New infections (cases)/year 1985-89	242,000 (42,000)
1998	40,000 (6,500)
Deaths from acute liver failure	Rare
Persons ever infected (1.8%)	3.9 million (3.1-4.8)*
Persons with chronic infection	2.7 million (2.4-3.0)*
Of chronic liver disease - HCV-related	40% - 60%
Deaths from chronic disease/year	8,000-10,000

*95% Confidence Interval

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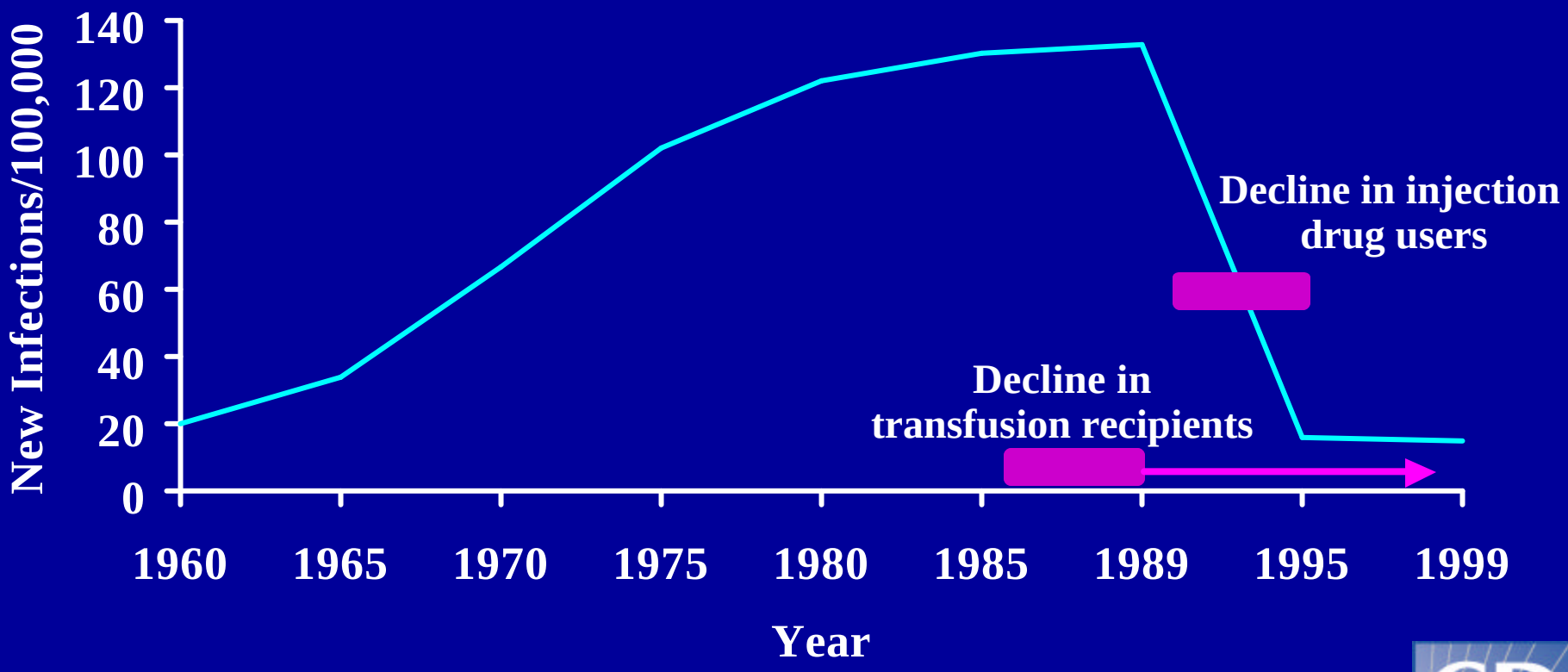
Estimated Incidence of Acute HCV Infection United States, 1960-1999



Source: Hepatology 2000;31:777-82; Hepatology 1997;26:62S-65S

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Prevalence of HCV Infection United States, 1988-1994

Group	Anti-HCV Positive	Est. Infections millions (95% CI)	Percent of Infections
Total	1.8%	3.9 (3.1-4.8)	100%
Race/ethnicity			
White	1.5%	2.4 (1.8-3.1)	61%
Black	3.2%	0.8 (0.6-1.0)	20%
Mex American	2.1%	0.3 (0.2-0.3)	7%
Other	2.9%	0.5 (0.3-1.0)	13%

Source: NEJM 1999;341:556-62

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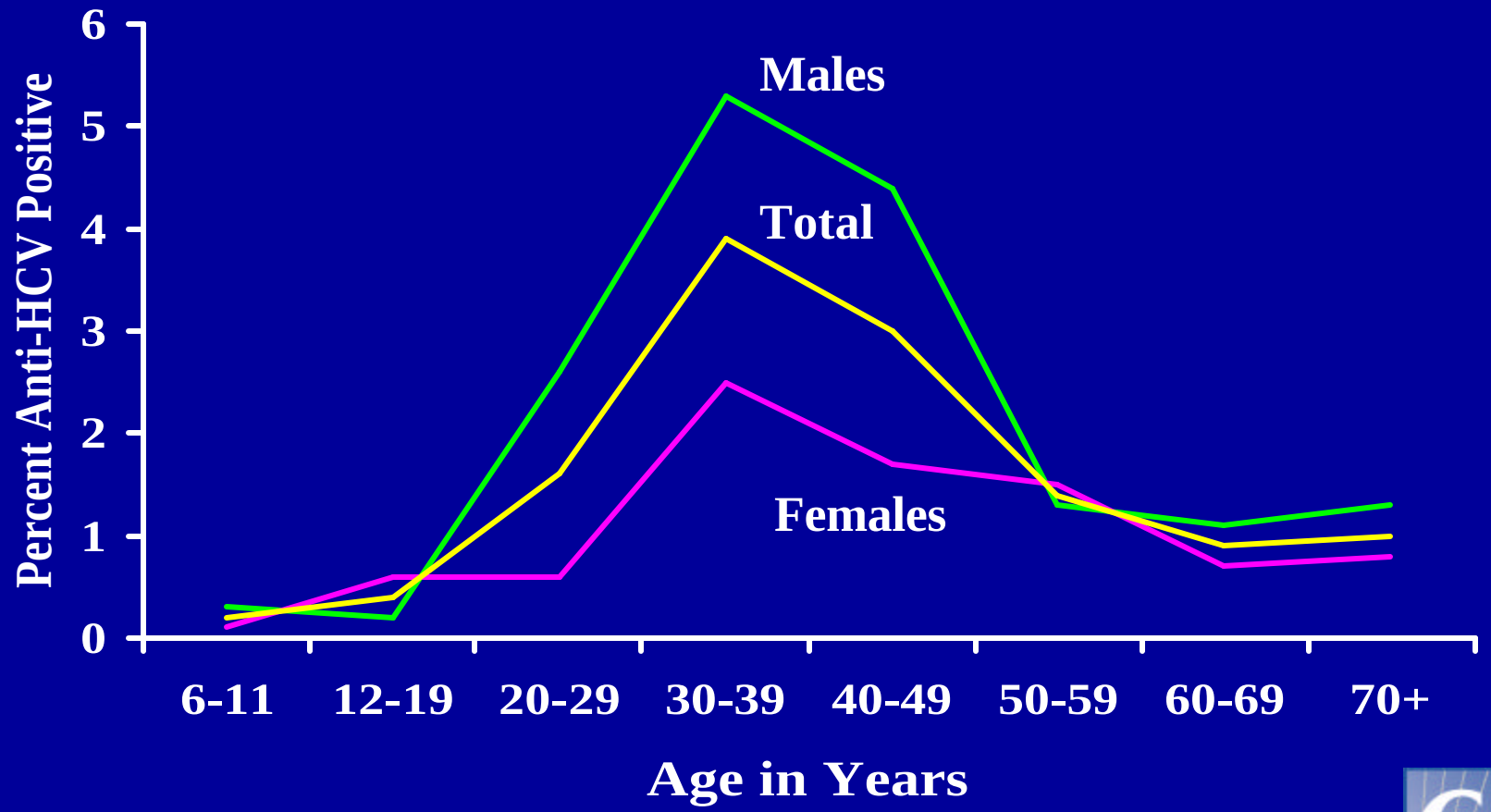
Prevalence of HCV Infection by Age and Gender, United States, 1988-1994



Source: CDC, NHANES III

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Transmission of HCV

- **Percutaneous**
  - Injecting drug use
  - Clotting factors before viral inactivation
  - Transfusion, transplant from infected donor
  - Therapeutic (contaminated equipment, unsafe injection practices)
  - Occupational (needlestick)
- **Permucosal**
  - Perinatal
  - Sexual

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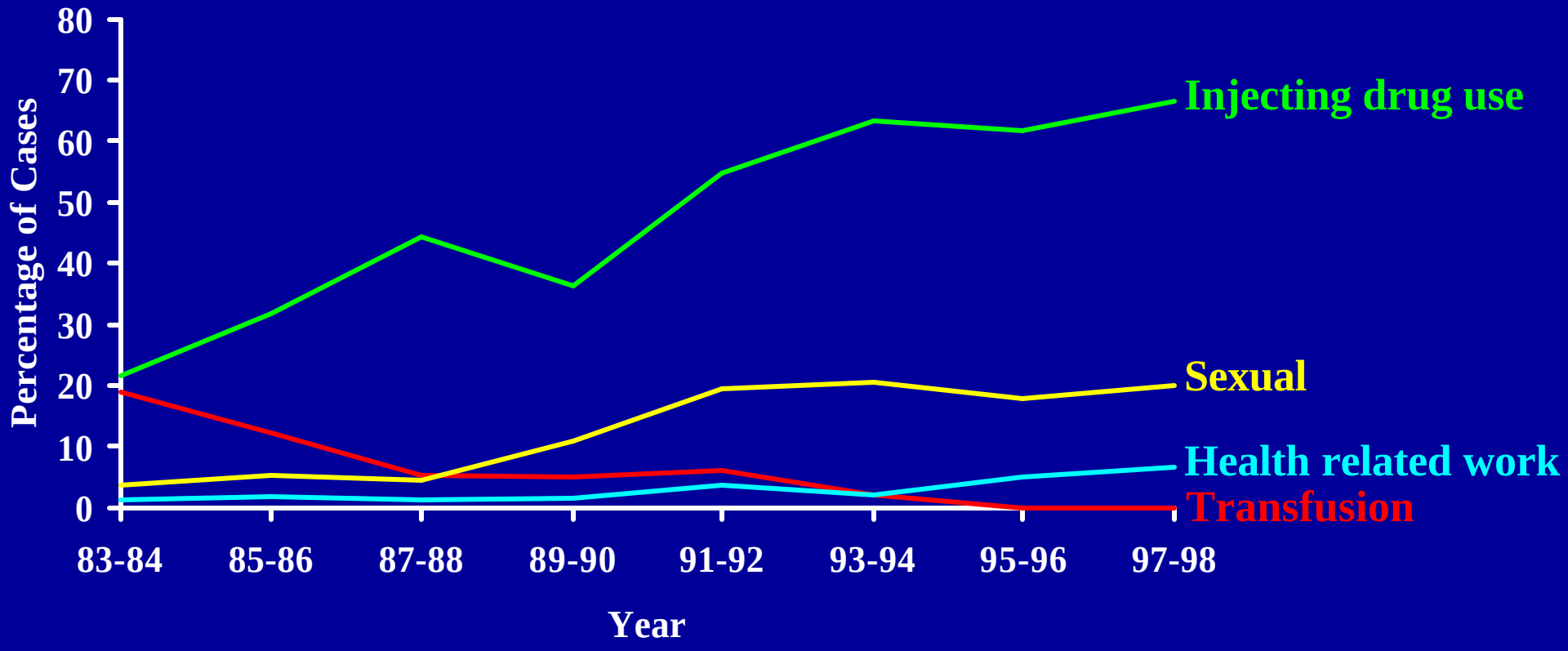
Reported Cases of Acute Hepatitis C by Selected Risk Factors, United States, 1983-1998*



* 1983-1990 based on non-A, non-B hepatitis

Source: CDC Sentinel Counties Study

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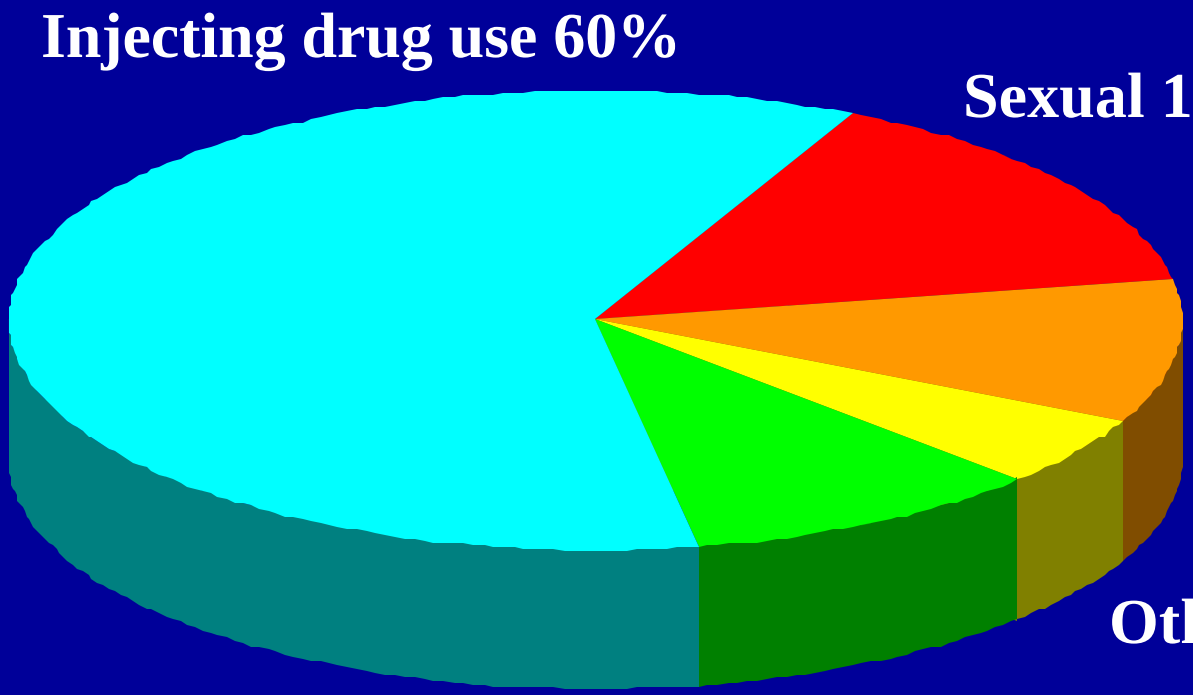
Sources of Infection for Persons with Hepatitis C



*Nosocomial; Health-care work; Perinatal

Source: Centers for Disease Control and Prevention

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Injecting Drug Use and HCV Transmission

- Highly efficient among injection drug users
- Rapidly acquired after initiation
- Four times more common than HIV
- Prevalence 60-90% after 5 years

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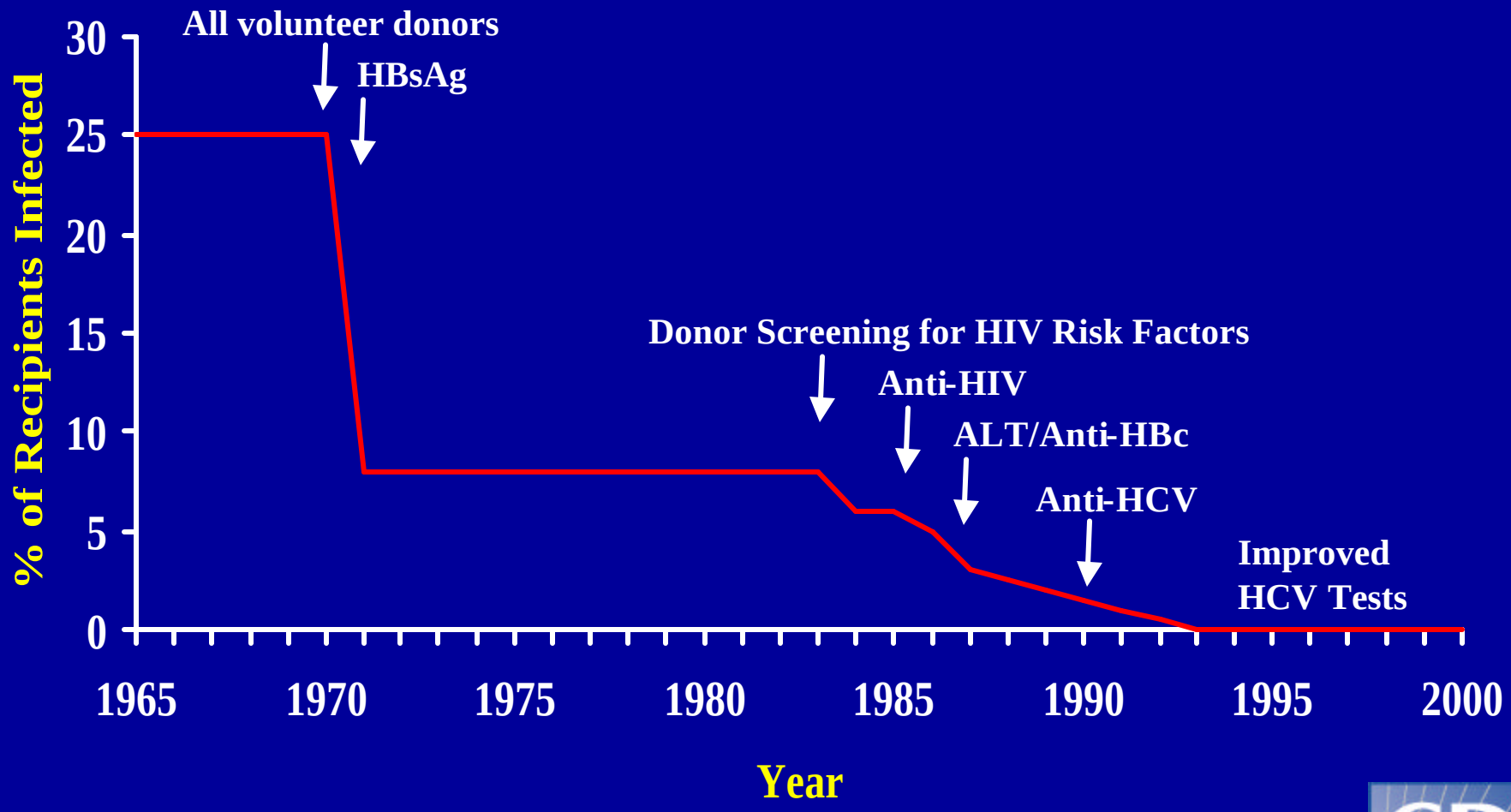
Posttransfusion Hepatitis C



Adapted from HJ Alter and Tobler and Busch, Clin Chem 1997

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Nosocomial Transmission of HCV

- Recognized primarily in context of outbreaks
- Contaminated equipment
  - hemodialysis*
  - endoscopy
- Unsafe injection practices
  - plasmapheresis,* phlebotomy
  - multiple dose medication vials
  - therapeutic injections

* Reported in U.S.

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Occupational Transmission of HCV

- Inefficiently transmitted by occupational exposures
- Average incidence 1.8% following needle stick from HCV-positive source
  - Associated with hollow-bore needles
- Case reports of transmission from blood splash to eye
  - No reports of transmission from skin exposures to blood
- Prevalence 1-2% among health care workers
  - Lower than adults in the general population
  - 10 times lower than for HBV infection
- Presence of recognized risk factor does not necessarily equate with “increased risk”

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HCW to Patient Transmission of HCV

- **Rare**
  - **In U.S., none related to performing invasive procedures**
- **Most appear related to HCW substance abuse**
  - **Reuse of needles or sharing narcotics used for self-injection**
  - **Reported mechanism for transmission of other bloodborne pathogens from some HCWs**
- **No restrictions routinely recommended for HCV-infected HCWs**

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Perinatal Transmission of HCV

- **Transmission only from women HCV-RNA positive at delivery**
  - **Average rate of infection 6%**
  - **Higher (17%) if woman co-infected with HIV**
  - **Role of viral titer unclear**
- **No association with**
  - **Delivery method**
  - **Breastfeeding**
- **Infected infants do well**
  - **Severe hepatitis is rare**

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Sexual Transmission of HCV

- Case-control, cross sectional studies
  - infected partner, multiple partners, early sex, non-use of condoms, other STDs, sex with trauma
  - MSM no higher risk than heterosexuals
- Partner studies
  - low prevalence (1.5%) among long-term partners
    - infections might be due to common percutaneous exposures (e.g., unsafe injections, drug use)
  - male to female transmission more efficient
    - more indicative of sexual transmission

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Sexual Transmission of HCV

- **Occurs, but efficiency is low**
  - Rare between long-term steady partners
  - Factors that facilitate transmission between partners unknown (e.g., viral titer)
- **Accounts for 15-20% of acute and chronic infections in the United States**
  - Sex is a common behavior
  - Large chronic reservoir provides multiple opportunities for exposure to potentially infectious partners

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Household Transmission of HCV

- Rare but not absent
- Could occur through percutaneous/mucosal exposures to blood
  - Theoretically through sharing of contaminated personal articles (razors, toothbrushes)
  - Contaminated equipment used for home therapies
    - Injections*
    - Folk remedies

*Reported in U.S.

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Other Potential Exposures to Blood

- No or insufficient data showing increased risk
  - intranasal cocaine use, tattooing, body piercing, acupuncture, military service
- Limited number of studies showing associations that cannot be generalized
  - convenience or highly selected groups (mostly blood donors)
- No associations in acute case-control or population-based studies

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Case-Control Studies of Acute Hepatitis C, U.S.

Exposures Not Associated with Acquiring Disease, 1979-1985

Exposure (prior 6 months)	Cases n=148	Controls n=200
Medical care procedures	30.4%	29.5%
Dental work	24.3%	23.5%
Health care work (no blood contact)	4.1%	5.0%
Ear piercing	2.7%	3.0%
Tattooing	0.7%	0.5%
Acupuncture	0	1.0%
Foreign travel	4.1%	2.5%
Military service	1.3%	4.9%

Source: JID 1982;145:886-93; JAMA 1989;262:1201-5.

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Other Potential Exposures to Blood

- Biologically plausible but no data showing these practices, procedures, or histories alone place persons at increased risk for HCV
- May be limited to certain settings and account for small fraction of cases
  - e.g., prisons, unregulated practitioners, populations with certain cultural practices, etc.
- Risk factor or high prevalence identified in selected subgroup cannot be extrapolated to the population

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Reduce or Eliminate Risks for Acquiring HCV Infection

- Screen and test donors
- Virus inactivation of plasma-derived products
- Risk-reduction counseling and services
  - Obtain history of high-risk drug and sex behaviors
  - Provide information on minimizing risky behavior, including referral to other services
  - Vaccinate against hepatitis A and/or hepatitis B
- Infection control practices

MMWR 1998;47 (No. RR-19)

Reduce Risks for Disease Progression and Further Transmission

- **Identify persons at risk for HCV and test to determine infection status**
  - **Routinely identify at risk persons through history, record review**
- **Provide HCV-positive persons**
  - **Medical evaluation and management**
  - **Counseling**
    - **Prevent further harm to liver**
    - **Prevent transmission to others**

MMWR 1998;47 (No. RR-19)

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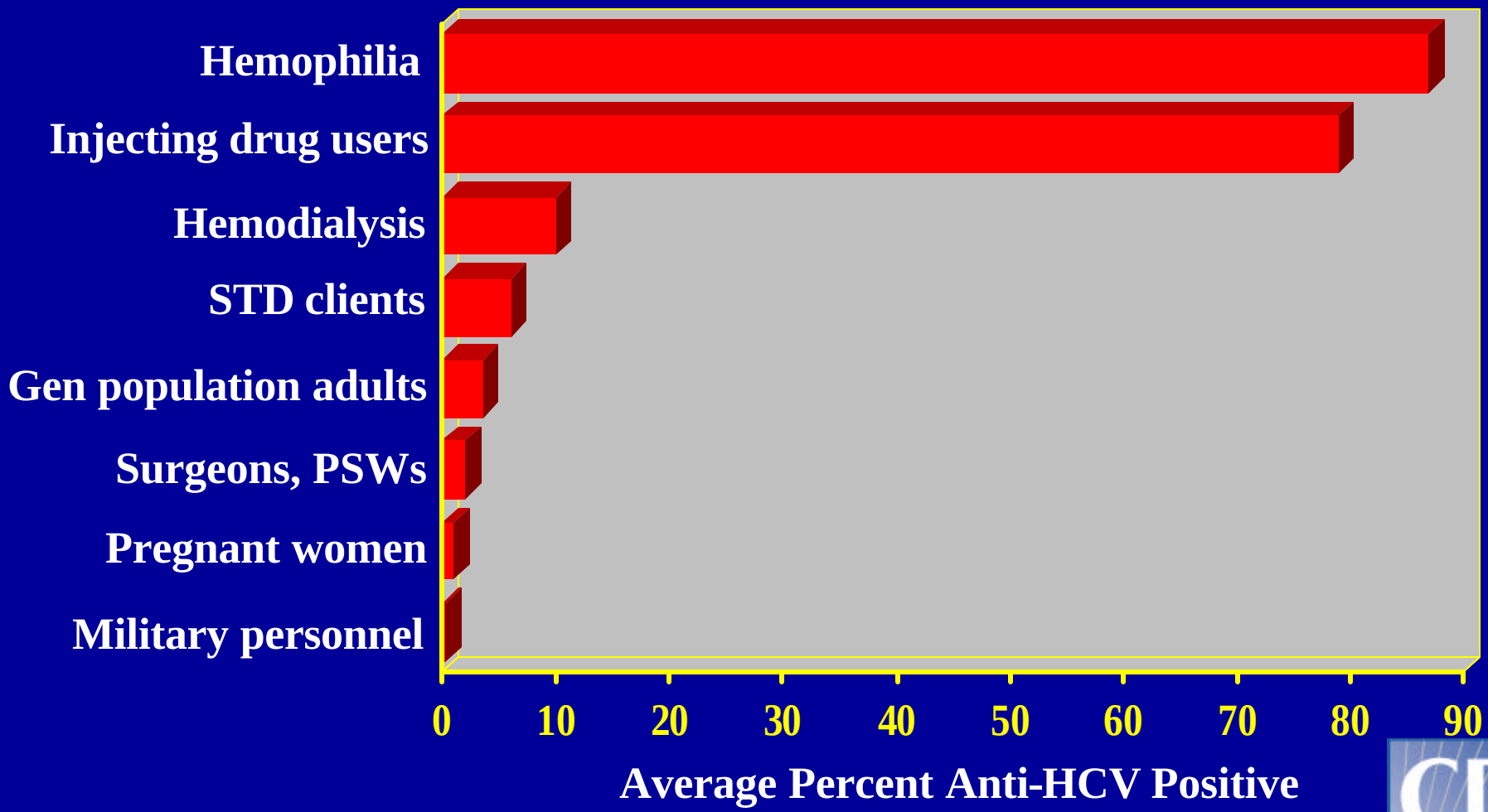
HCV Prevalence by Selected Groups United States



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HCV Testing Routinely Recommended

Based on increased risk for infection

- Ever injected illegal drugs
- Received clotting factors made before 1987
- Received blood/organs before July 1992
- Ever on chronic hemodialysis
- Evidence of liver disease

Based on need for exposure management

- Healthcare, emergency, public safety workers after needle stick/mucosal exposures to HCV-positive blood
- Children born to HCV-positive women

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Postexposure Management for HCV

- IG, antivirals not recommended for prophylaxis
- Follow-up after needlesticks, sharps, or mucosal exposures to HCV-positive blood
  - Test source for anti-HCV
  - Test worker if source anti-HCV positive
    - Anti-HCV and ALT at baseline and 4-6 months later
    - For earlier diagnosis, HCV RNA by PCR at 4-6 weeks
  - Confirm all anti-HCV results with RIBA
- Refer infected worker to specialist for medical evaluation and management

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Routine HCV Testing Not Recommended
(Unless Risk Factor Identified)

- Health-care, emergency medical, and public safety workers
- Pregnant women
- Household (non-sexual) contacts of HCV-positive persons
- General population

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Routine HCV Testing of Uncertain Need

Not confirmed as risk factor/prevalence unknown

- Recipients of transplanted tissue
- Intranasal cocaine or other non-injecting illegal drug users
- History of tattooing, body piercing

Confirmed risk factor but prevalence of infection low

- History of STDs or multiple sex partners
- Long-term steady sex partners of HCV-positive persons

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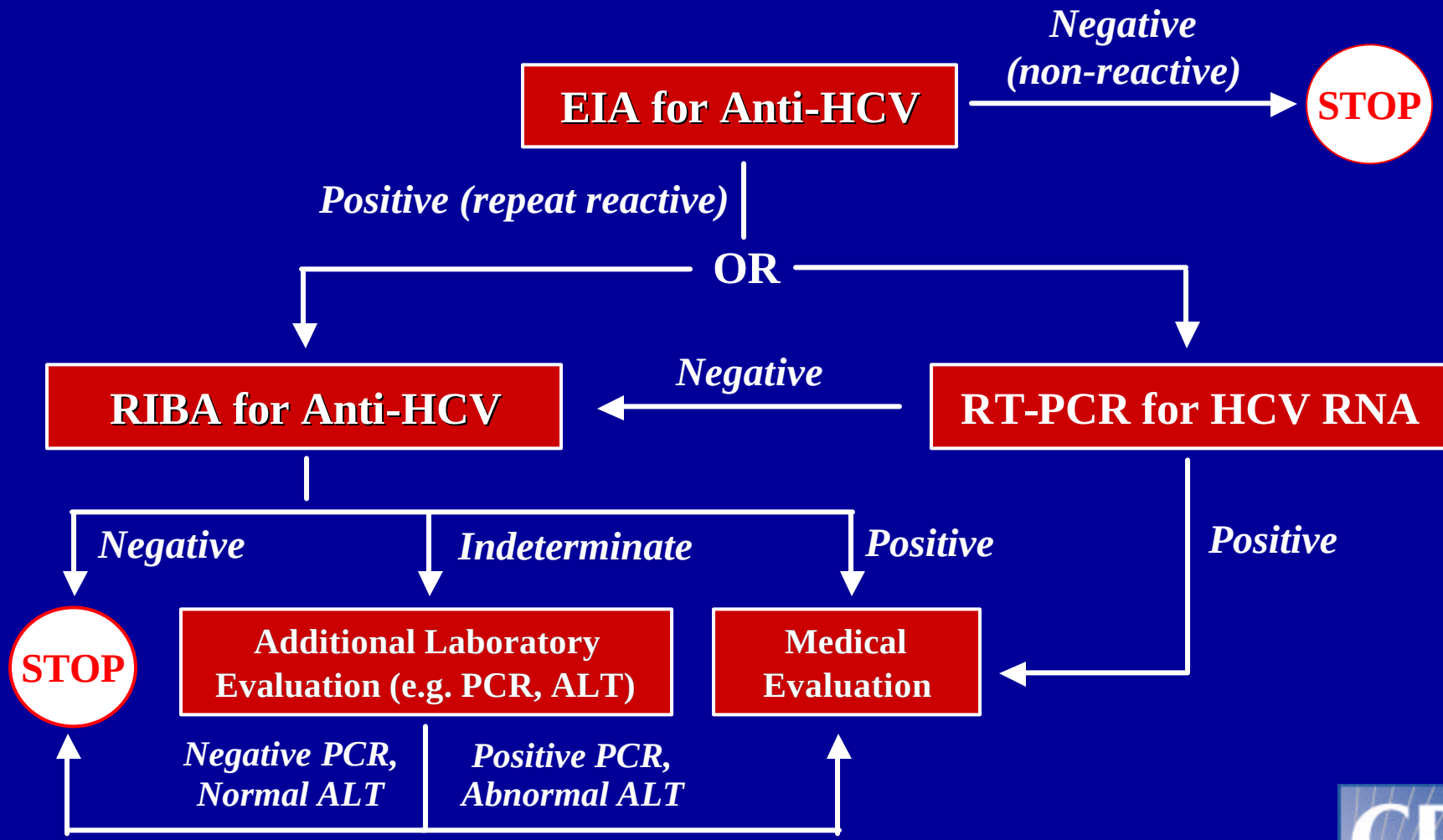
HCV Infection Testing Algorithm for Diagnosis of Asymptomatic Persons



Source: MMWR 1998;47 (No. RR 19)

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Medical Evaluation and Management for Chronic HCV Infection

- Assess for biochemical evidence of CLD
- Assess for severity of disease and possible treatment, according to current practice guidelines
  - 30-40% sustained response to antiviral combination therapy (interferon alpha, ribavirin)
  - Vaccinate against hepatitis A
- Counsel to reduce further harm to liver
  - Limit or abstain from alcohol

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HCV Counseling

- **Prevent transmission to others**
  - **Direct exposure to blood**
  - **Perinatal exposure**
  - **Sexual exposure**
- **Refer to support group**

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Preventing HCV Transmission to Others

Avoid Direct Exposure to Blood

- Do not donate blood, body organs, other tissue or semen
- Do not share items that might have blood on them
  - personal care (e.g., razor, toothbrush)
  - home therapy (e.g., needles)
- Cover cuts and sores on the skin

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Persons Using Illegal Drugs

- **Provide risk reduction counseling, education**
  - **Stop using and injecting**
  - **Refer to substance abuse treatment program**
  - **If continuing to inject**
    - **Never reuse or share syringes, needles, or drug preparation equipment**
    - **Vaccinate against hepatitis B and hepatitis A**
    - **Refer to community-based risk reduction programs**

Mother-to-Infant Transmission of HCV

- Postexposure prophylaxis not available
- No need to avoid pregnancy or breastfeeding
  - Consider bottle feeding if nipples cracked/bleeding
- No need to determine mode of delivery based on HCV infection status
- Test infants born to HCV-positive women
  - Consider testing any children born since woman became infected
  - Evaluate infected children for CLD

Sexual Transmission of HCV

Persons with One Long-Term Steady Sex Partner

- Do not need to change their sexual practices
- Should discuss with their partner
  - Risk (low but not absent) of sexual transmission
  - Routine testing not recommended but counseling and testing of partner should be individualized
    - May provide couple with reassurance
    - Some couples might decide to use barrier precautions to lower limited risk further

Sexual Transmission of HCV

Persons with High-Risk Sexual Behaviors

- At risk for sexually transmitted diseases, e.g., HIV, HBV, gonorrhea, chlamydia, etc.
- Reduce risk
  - Limit number of partners
  - Use latex condoms
  - Get vaccinated against hepatitis B
  - MSMs also get vaccinated against hepatitis A

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Other Transmission Issues

- HCV not spread by kissing, hugging, sneezing, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact
- Do not exclude from work, school, play, child-care or other settings based on HCV infection status